AIOTI WG03 Workshop
IoT Platforms & Standardization
Industrial IoT Panel
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Hello!

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The first IT player in Italy:
9% market share
> 1,000 large accounts in all markets
> 8,100 employees

Technical background: developing and delivering commercial solutions to the industry and finance sectors
Current role: project coordinator of FAR-EDGE, technical lead of BEinCPPS
Perspective on IIoT standardization: digital platforms for the manufacturing industry, pilot experimentations focused on real-world production scenarios
Setting the Context

FoF-09-2015 – ICT Innovation for Manufacturing SMEs (I4MS)

FoF-11-2016-b – Novel Architectures for Factory Automation

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<th>Project Summary</th>
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Common Philosophy

Open Platforms
Open Source Software
Technical results assessed on real production systems
Different Strategies

**BE in CPPS**

**Digitizing Industry**

Innovation Action: adoption/extension of Cyber-Physical Production Systems

major focus on business/migration

**FAREDGE**

**Leadership in Digital Platforms**

Research & Innovation Action: advancement over SotA

major focus on technology/functionality
Different Approaches

**Bottom-up:** from an existing generic platform to the implementation of specific use cases
(users build their innovation on top of available functionality)

**Top-down:** from specific user requirements to the design and implementation of a more generic platform
(users start from an abstract “platform concept”)

BE in CPPS

FAREDGE
**BEinCPPS Overview**

**Business Experiments in Cyber-Physical Production Systems**

- **Goals**
  - Integrate a novel service platform based on SotA technology – i.e., as a convergence of CPS, IoT and Future Internet platforms
  - Experiment new CPS-based business processes in pilot factories located in five European regions (“Regional Champions”)

- **Impact**
  - Build an SME-oriented business ecosystem based on the service platform and on regionally-scoped Digital Innovation Hubs
  - Extend the Regional Champion experience to other regions by means of Open Calls

- **Status**
  - Sixteen months into the project
  - First-generation service platform deployed on pilot factories, first round of experimentation ongoing, launching of DIHs

[http://beincpps.eu/](http://beincpps.eu/)
The BEinCPPS Pilots

- **Norte (PT)**
  - Footwear
  - Instituto de Telecomunicações (iP)
  - iESE (Instituto de Engenharia de Sistemas e Tecnologias de Informação)

- **Euskadi (ES – Basque Country)**
  - Plastic Components for Automotive Ind.
  - MAIER
  - Inovaialia

- **Baden-Württemberg (DE)**
  - Industrial Vehicles for Agriculture
  - JOHN DEERE
  - Fraunhofer IPA

- **Rhône-Alpes (FR)**
  - Injection Moulds for Thermoplastic Parts
  - Georges Ferrières
  - CEA

- **Lombardy (IT)**
  - White Goods
  - Whirlpool
  - Engineering
FAR-EDGE Overview

• Goals
  • Reference implementation of an IoT-enabled open platform for FA based on Edge Computing principles and Blockchain technology for shortening data paths and decentralize control
  • Enable more powerful and flexible FA solutions

• Impact
  • Creation of a multi-sided ecosystem (OEMs, ICT providers and integrators, standard bodies and communities, end users) around the open platform

• Status
  • Five months into the project
  • Investigating scenarios, requirements, standards & technologies
  • Design of the open platform’s architecture started
The FAR-EDGE Pilots

Process Agility

Cross-Plant Process Synchronization
Approach to Standards

Basic Goal: Communicate with people

Basic Goal #1: Operate your system

Basic Goal #2: Cooperate with other systems

Architecture Standards
Platform Design

Technical Standards
Platform Implementation and Operation
Standard Adoption

BE in CPPS

FIWARE
OPENIoT
4diac
HYPERLEDGER

RAMI4.0
IIRA

Convergence?

Status: Inherited from SotA

Technical Standards in Implementation and Operation

Status: Considered for dissemination & exploitation
Standard Adoption

BE in CPPS

RAMI4.0
IIRA
Convergence?

Automation
IEC61499
BPMN2.0

Security
OAuth2.0

Communication
NGSI
MQTT
OPC UA
AMQP
CoAP
LWM2M
Lessons Learned:
The Manufacturing Enterprise Perspective

• Standardization can only be pushed forward by *business concerns* like *reducing cost*, *avoiding vendor lock-in* and *enabling new/enhanced business processes*

• In planning the adoption of standards, reduction of cost must be *objectively proven*

• Vendor lock-in is normally *not perceived as a concern*, but this is *slowly changing*

• Enhancing existing processes is *perceived as difficult*, because of the *risk of disruption*

• Introducing entirely new processes (or even plants) is *perceived as less difficult*
Lessons Learned: The Technology Provider Perspective

• Pursuing vendor lock-in is gradually becoming a **less profitable and more risky** strategy
• Standards tend to **reduce the cost of development**, but are **not a competitive advantage**
Lessons Learned:  
The Research Project Perspective

• The mission is to **promote technology**, using funding and **sandboxed** environments to **overcome the barriers to experimentation**
• Running on-the-field experimentation is like injecting new technology into the factory’s DNA: in the end, the expected result is to **lower the barriers to future adoption**
• Promoting standardization is **not different** than promoting new technologies
Status Check: IIoT Interop in Factories

Gridwise Interoperability Context Setting Framework
From AIOTI WG03 report on Semantic Interoperability, v2.0

- Current target of innovation actions: **achieve semantic interoperability**
  - Adoption by the manufacturing industry mandates mature standards
  - Ontologies and ICT tools are in the early stages of their development
  - Awareness of users is low, research actions **must demonstrate business benefits**

- Current target of innovation actions: **standardize field communication**
  - Mature standards are available
  - Mature ICT tools are starting to be available
  - Market demand is low but growing – at least for **new equipment**
Focus on Communication

Gridwise Interoperability Context Setting Framework
From AIOTI WG03 report on Semantic Interoperability, v2.0
Focus on Semantic Interoperability

Not a requirement today at the **Edge level**: shopfloor systems are mostly homogeneous, RT control software is built ad-hoc

- Might change when plug-and-produce smart objects / machinery will become a reality outside of labs (e.g., SmartFactoryKS)

Not a requirement at the **Cloud level** as well: plant / factory / enterprise systems are *wired* to the Edge level by ad-hoc integration

- Might change if manufacturing industries will adopt standard-based off-the-shelf solutions for their upper layers of the automation pyramid, or even outsource them to SaaS providers (e.g., Virtual Fort Knox)
Thank you!
by Mauro Isaja – mauro.isaja@eng.it